REMARKS

Applicant appreciates the thorough examination of the present application that is reflected in the Official Action of July 18, 2001. The examination of this application evidences a high degree of technical understanding by the Examiner, as well as attention to detail. Applicant is particularly grateful to the Examiner for citing the Bruckert et al. reference, of which Applicant was not aware, so that claims which are patentable over Bruckert et al. can be presented, and the validity of the patent that results from the present application will be enhanced.

For the convenience of the Examiner, the points raised in the Official Action will be responded to in the order in which they were raised.

A New Set of Formal Drawings Is Being Supplied

A new set of formal drawings is being filed concurrently. In the new formal drawings, Figures 2 and 3 are designated as "Prior Art".

The Specification Has Been Amended

The specification has been amended to correct the inconsistencies noted by the Examiner. In particular, the Examiner is correct that "X" was used for too many things on Page 8, lines 19-25. In response, one of the "X"s has been changed to "g" to indicate an index for the base stations. Moreover, the incorrect "t" has been replaced by a "T" in Equation (5). Applicant also notes that the "b" in Equation (5) should have been an "e", and has made these corrections, as well.

Moreover, Page 9, line 11 has been amended as suggested by the Examiner. Applicant appreciates the Examiner's finding these inconsistencies in the specification.

The Rejection Under 35 USC §112 Has Been Overcome

Independent Claim 1 and dependent Claims 2-8 that depend therefrom, have been rejected under 35 USC §112, second paragraph, because the claim makes it unclear how the detection statistics are obtained. The Examiner suggests changing the recitation "so as to obtain detection statistics" to --such that the step of combining

obtains detection statistics--. This amendment has been made in Claim 1, so that the rejection under 35 USC §112 has been overcome.

Claims 1-2, 4-5, 7-9, 12-13, 15-16, 18-20, 23-24, 26-27 and 29-31 Are Patentable Over Bruckert et al.

These claims were rejected under 35 USC §102(e) as being anticipated by U.S. Patent 5,812,542 to Bruckert et al. In response, independent Claims 1, 12 and 23 have been amended to recite scaling of traffic and/or pilot despread values. Thus, for example, amended Claim 1 now recites:

> scaling the traffic despread values and/or the pilot despread values by the scale factors such that the step of combining obtains detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

Similar recitations may be found in Claims 12 and 23. As noted by Bruckert et al., weighting factors are generated using the channel estimates. However, Bruckert et al. does not describe or suggest scaling the traffic despread values and/or the pilot despread values by scale factors, as recited in amended Claims 1, 12 and 23. Accordingly, the rejection under 35 USC §102(e) has been overcome.

Applicant also wishes to note that the claimed scaling of traffic and/or pilot despread values can provide advantages over Bruckert et al.'s scaling of channel estimates. In particular, the power of a traffic signal generally is lower than the power of a pilot signal. Thus, in the equation in Bruckert et al. at Column 9, line 65, the scaling factor Y_j generally will be less than 1. Since the scaling factor is a small number, a smaller number of bits may be used for storing the scale factor. However, channel estimates generally change very slowly, and may only be updated once per slot. Therefore, there may not be much savings in memory by scaling the channel estimates, as described in Bruckert et al. In sharp contrast, the claimed pilot despread values and the traffic despread values generally are updated more often than channel estimates. Thus, embodiments of the invention, as now recited in Claims 1, 12 and 23, may be able to reduce the amount of memory that is used for the values that are updated more often.

In view of the above, independent Claims 1, 12 and 23, and dependent Claims 2, 4-5, 7-9, 13, 15-16, 18-20, 24, 26-27 and 29-31 are patentable over Bruckert et al.

Applicant also wishes to note that, in order to expedite allowance of the present application, Claims 3, 10-11, 14, 21-22, 25 and 32-33 have been canceled.

Claims 2, 13, and 24 Are Patentable Over Bruckert et al.

These claims were rejected under 35 USC §103 over Bruckert et al. Applicant respectfully submits that these claims are patentable over Bruckert et al. per the patentability of independent Claims 1, 12 and 23 from which they depend.

Claims 6, 17 and 28 Are In Condition For Allowance

Claim 6, 17 and 28 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Claims 17 and 28 now have been rewritten in independent form by incorporating the recitations of originally filed Claims 12 and 23 therein. Claim 6 also has been rewritten in independent form by incorporating the recitations of originally filed Claim 1 therein, except that these recitations have been amended to overcome the rejection under 35 USC §112, as described above.

New Claims 34-39 Are Patentable Over Bruckert et al.

New independent Claim 34 includes all of the recitations of original Claim 1, as amended to overcome the rejection under 35 USC §112. In addition, new Claim 34 recites:

> wherein the step of forming scale factors comprises the steps of:
> estimating power on a pilot channel;
> estimating power on a traffic channel;
> dividing the estimated power on a traffic channel by the estimated power on the pilot channel to produce a power ratio; and
> obtaining a square root of the power ratio to produce the scale factor.

Applicant respectfully submits that Bruckert et al. does not describe or suggest these recitations. In particular, Bruckert et al. at Column 9, line 65, describes the scale factor as being the power of the traffic signal of interest transmitted by base station j, divided by the power of the pilot signal transmitted by base station j. In sharp contrast, Claim 34 recites that a square root of the power ratio is obtained to produce

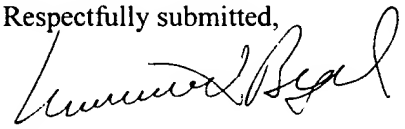
the scale factor. Support for this recitation may be found, for example, in Figure 7 of the present application at Block **710**, and the accompanying description, for example at Page 9, lines 23-33 of the specification.

According to embodiments of the invention, as recited in Claims 34-39, Applicant has realized that the square root of the estimated power in the traffic signal divided by the estimated power in the pilot channel can produce a more accurate representation of the scale factor. Accordingly, Claim 34 is patentable over Bruckert et al. Claim 35 is patentable as depending on patentable Claim 34. Claims 36-39 are means plus function and structural analogs of Claims 34 and 35, and are patentable for the same reasons.

Conclusion

Applicant again wishes to thank the Examiner for the thorough examination and the citation of Bruckert et al. The independent claims now all have been amended to patentably distinguish over Bruckert et al. and new claims have been added that also patentably distinguish over Bruckert et al. Accordingly, Applicant respectfully requests allowance of the present application and passing the application to issue.

Respectfully submitted,



Mitchell S. Bigel
Registration No. 29,614
Attorney for Applicants

Myers Bigel Sibley & Sajovec, P.A.
P.O. Box 37428
Raleigh, North Carolina 27627
Telephone: 919/854-1400
Facsimile: 919/854-1401

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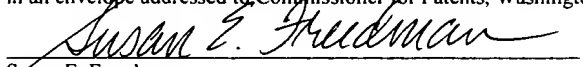
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Commissioner for Patents, Washington, DC 20231, on November 6, 2001.



Susan E. Freedman
Date of Signature: November 6, 2001

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The following is an addendum to the concurrently filed Amendment in response to the Official Action dated July 18, 2001, in the above-referenced application. This addendum includes a marked-up version of the changes made to the specification and claims by the present Amendment.

In the Specification:

The paragraph at Page 8, lines 19-25 has been amended as follows:

Despreading is used to form despread values for the traffic channels for each base station signal, denoted $[x_T^x]$ $\underline{x}_T^g$, where x indicates the base station signal and g is an index for the base stations. For optimal performance, the detection statistic z should be

$$[z = K_d \hat{c}_d^* x_t^d + K_b \hat{c}_e^* x_t^e + K_f \hat{c}_f^* x_t^f]$$

$$\underline{z = K_d \hat{c}_d^* x_T^d + K_e \hat{c}_e^* x_T^e + K_f \hat{c}_f^* x_T^f} \qquad (5)$$

As shown in Equation (5), scale factors $[K_x]$ $\underline{K}_g$ are needed for optimal combining. However, if the approach described in Figures 2 and 3 is used, then the scale factors are not present, which can lead to suboptimal performance.

The paragraph at Page 9, lines 7-14 has been amended as follows:

An embodiment of the scaled combiner **406'** is illustrated in Figure 5. Compared to Figure 3, the traffic despread values are scaled prior to combining. Scalers **502a-502c** scale the complex traffic despread values by a real number multiplication. Scale factors are estimated in scale factors estimator **504**, which uses pilot and traffic despread values to form scale factors. Multipliers [**203a**] **302a-302c** are used to multiply the scaled traffic despread values and the channel estimates. An alternative can apply the scale factors to the channel estimates instead of the traffic despread values, prior to combining.

In the Claims:

Claim 1 has been amended as follows:

1. (Amended) A method of processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, comprising the steps of:

receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

estimating channel responses using the pilot despread values to produce channel coefficient estimates;

combining the traffic despread values to obtain detection statistics that correspond to information symbols, using the channel coefficient estimates; and

scaling [at least one of] the traffic despread values[, the channel estimates] and/or the pilot despread values by the scale factors [so as to obtain] such that the step of combining obtains detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

Claim 3 has been canceled.

Claim 6 has been amended as follows:

6. (Amended) [A method according to Claim 1]

A method of processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, comprising the steps of:

receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

estimating channel responses using the pilot despread values to produce channel coefficient estimates;

combining the traffic despread values to obtain detection statistics that correspond to information symbols, using the channel coefficient estimates; and

scaling at least one of the traffic despread values, the channel estimates and the pilot despread values by the scale factors such that the step of combining obtains detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

wherein the step of forming scale factors comprises the steps of:

forming an error signal using the pilot channel despread values and the traffic channel despread values; and

computing a scale factor based on the error signal.

Claims 10-11 have been canceled.

Claim 12 has been amended as follows:

12. (Amended) A system for processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, the system comprising:

means for receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

means for correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

means for forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

means for estimating channel responses using the pilot despread values to produce channel coefficient estimates;

means for combining the traffic despread values to obtain detection statistics that correspond to information symbols, using the channel coefficient estimates; and

means for scaling [at least one of] the traffic despread values[, the channel estimates] and/or the pilot despread values by the scale factors such that the means for combining obtains detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

Claim 14 has been canceled.

Claim 16 has been amended as follows:

16. (Amended) [A system according to Claim 12]

A system for processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, the system comprising:

means for receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

means for correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

means for forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

means for estimating channel responses using the pilot despread values to produce channel coefficient estimates;

means for combining the traffic despread values to obtain detection statistics that correspond to information symbols, using the channel coefficient estimates; and

means for scaling at least one of the traffic despread values, the channel estimates and the pilot despread values by the scale factors such that the means for combining obtains detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

wherein the means for forming scale factors comprises:

means for estimating power on a pilot channel;

means for estimating power on a traffic channel; and

means for determining scale factors based upon the estimated powers on the pilot channel and the traffic channel.

Claims 21-22 have been canceled.

Claim 23 has been amended as follows:

23. (Amended) A system for processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, the system comprising:

a receiver that receives data samples from the plurality of traffic channels and the plurality of pilot channels;

a correlator that correlates the received data samples to spreading codes to produce pilot despread values and traffic despread values;

a scale factor estimator that estimates scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

a channel coefficient estimator that estimates channel responses using the pilot despread values to produce channel coefficient estimates;

a combiner that combines the traffic despread values to obtain detection statistics that correspond to information symbols, using the channel coefficient estimates; and

a scaler that scales [at least one of] the traffic despread values[, the channel estimates] and/or the pilot despread values by the scale factors such that the combiner obtains detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

Claim 25 has been canceled.

Claim 28 has been amended as follows:

28. (Amended) [A system according to Claim 23 wherein the scale factor estimator comprises:]

A system for processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, the system comprising:

a receiver that receives data samples from the plurality of traffic channels and the plurality of pilot channels;

a correlator that correlates the received data samples to spreading codes to produce pilot despread values and traffic despread values;

a scale factor estimator that estimates scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

a channel coefficient estimator that estimates channel responses using the pilot despread values to produce channel coefficient estimates;

a combiner that combines the traffic despread values to obtain detection statistics that correspond to information symbols, using the channel coefficient estimates; and

a scaler that scales at least one of the traffic despread values, the channel estimates and the pilot despread values by the scale factors such that the combiner obtains detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels; and

an error signal generator that is responsive to the pilot channel despread values and the traffic channel despread values.

Claims 32-33 have been canceled.